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Design for Sustainable Waste Collection System

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The objective of this research was to design an effective Municipal Solid Waste Collection System (MSWCS) for School of Architecture and Design (SoAD), one of the faculties in King Mongkut's University of Technology Thonburi (KMUTT) in Bangkhuntien campus, Thailand, in order to improve users' Anti-Source Separation Performance (ASSP). A problem of SoAD toward Municipal Solid Waste (MSW) was that users did not separate MSW properly at source. In order to understand problems, first, the author carried out MSW composition and separation analysis to understand the nature of ASSP and to assess the composition of MSW in SoAD. Secondly, the author used the questionnaire survey and measured a trait of the ASSP in SoAD. SPSS program was utilized to understand key problems and mechanism of the ASSP. Thirdly, the author carried out participant observation and topical interview to understand how users modify the existing MSWCS in order to match with their needs in the local circumstances. It was suggested that the existing MSWCS fell into malfunction in the viewpoint of proper MSW separation at source, and the mean Correct Source Separation Rate (CSSR), which represents degree of the right performance of MSW separation, in the existing MSWCS was 32.8%. In addition, barriers for proper MSW separation (α=.90) and the following variables, which are poor understanding of MSWCS (α=.78), weak concernment with proper MSW separation (α=.84), poor maintenance of municipal solid waste collection point (α=.85), and difficulty of MSWCS (α=.76), cause the ASSP in SoAD. For the problem solution, the author designed a new MSWCS, which consists of Recycling Station Approach, and a religious incentive titled Tamboon (making merits in Thai) incentive. As a result, it could increase the mean CSSR to 88.7%, and the new MSWCS could dramatically improve users' ASSP; moreover, the incentive could encourage them to participate in proper MSW separation at the Recycling station. As a conclusion, sustainable MSWCS must be designed to match with users' needs in the local circumstances.

Keywords: Sustainable Design / University / Anti-Source Separation Performance / Municipal Solid Waste Collection System / Recycle Station Approach / Religious Incentive / Tamboon / Public participation